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To: Milwaukee-area physicians and other health care professionals

From: Geoffrey R. Swain, MD, MPH
Associate Medical Director, City of Milwaukee Health Department (MHD)

Re: Mumps Outbreak: laboratory testing

Yesterday, May 11th, the Wisconsin Immunization Program and the Wisconsin Lab of Hygiene (WSLH) issued a statement announcing that WSLH has suspended IgG and IgM testing for mumps. After discussions with the CDC and WSLH, the City of Milwaukee Health Department (MHD) is sending this alert with additional details regarding our understanding of this situation.

I. IgM testing for mumps

A. One of several brands of IgM test kits, "Bion," currently being used by WSLH, may have a higher than acceptable false positive rate. WSLH is looking into this closely, in concert with the CDC and other public health laboratories nationwide. During this period of investigation, WSLH has decided to suspend its IgM testing. The MHD lab, which was also using the Bion product, has followed suit, and is arranging for alternative means to obtain IgM testing. **There is no similar concern regarding IgG testing. IgG testing for pre-contact immune status can and should be done as always.**

B. Other commercial labs may use other test kits or procedures for IgM, and, in the absence of further information to the contrary, **IgM testing is still recommended as one of several important laboratory approaches to the diagnosis of mumps.** ***However, it should only be performed on individuals who have mumps symptoms.***

C. Clinicians should be aware that mumps IgM can take up to 5 days to rise after symptom onset. This is one cause of false-negative IgM tests if the specimen is taken early in the course of symptoms. Consider a repeat IgM 7-10 days later if the first is negative and was taken early in the symptom course.

II. IgG testing for mumps

A. IgG testing for pre-contact immune status can and should be done as always.

B. **Mumps IgG titers may rise rapidly after disease onset**. So, in a true case of mumps,

1. **an initial positive IgG titer** may be misinterpreted as representing pre-existing immunity when in fact it **may represent an acute response to new infection**

2. the acute IgG titer may already be high, and a four-fold rise in IgG titer between acute and convalescent titers may therefore be difficult or impossible to discern.

C. Some IgG tests are done with an ELISA method and are difficult to provide quantitative comparison between acute and convalescent titers. Clinicians should be aware of what test modality is being used by their lab of choice, and interpret results accordingly.

D. If quantitative comparison of IgG using acute and convalescent sera is not possible using that test modality, then there is no benefit to drawing a convalescent IgG specimen if the first was already positive. However, a convalescent IgG is useful when the acute specimen was negative regardless of which test modality is used.

E. Given the above, and since previously-vaccinated individuals are highly likely to be IgG positive, acute IgG testing of post-exposure or symptomatic patients may not be of much value in previously-vaccinated individuals.

III. Lab confirmation

A. Persons with 2 or more days of salivary gland swelling or tenderness are considered probable case of mumps. Anyone with a 4-fold rise in IgG between acute and convalescent specimens, or a positive PCR or viral culture for mumps should be considered a lab confirmed case of mumps. A positive IgM constitutes lab confirmation only in a patient with a clinical picture clearly consistent with mumps. Note: the same infection control precautions should be used with both confirmed and probable cases.

B. The **predictive value of a positive mumps culture or PCR test is excellent.** Anyone with a positive mumps culture or PCR should be considered a lab-confirmed case.

C. The **predictive value of a negative mumps culture or PCR test is only fair.** A negative result on these tests should be considered in the clinical context of the case, and may or may not be sufficient to rule out mumps, depending on clinical judgment.

D. Therefore, in the context of an outbreak, a person who has classic signs of mumps – i.e., anyone with 2 or more days of salivary gland swelling or tenderness – should be considered a probable case even if they end up with a negative IgM, negative viral culture, and negative PCR. However, such lab results are sufficient to rule out mumps in a person with only borderline or suspicious mumps symptoms.

IV. Recommended Lab Testing:

A. **All persons with suspected mumps should be tested. Samples should include a buccal swab and urine for culture and PCR, as well as blood for serology as noted above.** All samples should be sent either to the City of Milwaukee Health Department Labor to a commercial lab; culture and PCR specimens may still be sent to the WSLH.

B. As with all tests, the clinician should be aware of the potential for false negative and false positive results in mumps testing, particularly in serologies and in negative culture or PCR tests, and should interpret the test result in the context of the clinical picture.

V. Required Reporting:

A. **All suspect cases** – including anyone with 2 or more days of salivary gland swelling or tenderness – **MUST be reported to the local health department regardless of test results.** Cases in Milwaukee County should be reported to SurvNet at **414-286-3624**.

B. Clinicians are urged to contact the appropriate local public health agency (LPHA) for additional case/contact information and assistance in interpretation and management of individual cases. Your LPHA has substantial information regarding the overall ongoing public health investigation and management of this outbreak, including information that may be specifically relevant to your particular patient.

If you have questions, please contact your local health department. In the City of Milwaukee, please contact MHD at 414-286-3606 or 414-286-3521.